Patent Claims:

1. Actuating unit for an electromechanically actuated disc brake for automotive vehicles that is mounted on a brake caliper in which two friction linings (4, 5) are arranged that interact with each one lateral surface of a brake disc (6) so as to be slidable within limits, wherein one (4) of the friction linings (4, 5) is movable into engagement with the brake disc by the actuating unit directly by means of an actuating element (15) and the other friction lining (5) is movable into engagement with the brake disc (6) by the effect of a reaction force generated by the brake caliper, wherein the actuating unit is comprised of an electric motor (10) and a reducing gear (2) interposed between the electric motor (10) and the actuating element (15), and wherein a freewheel mechanism (35) is provided that is in interaction with the electric motor (10) and has the function of a parking brake,
c h a r a c t e r i z e d in that the freewheel mechanism (35) is configured so that its clamping effect is ensured by a form-locking torque transmission, and in that, in its actuated state, it prevents a rotational movement of a bearing (24) in which the rotor (11) of the electric motor (10) is mounted.

2. Actuating unit as claimed in claim 1,
c h a r a c t e r i z e d in that the freewheel mechanism (35) along with the bearing (24) forms a subassembly.

3. Actuating unit as claimed in claim 2,
c h a r a c t e r i z e d in that both the outside ring (36) and the inside ring (37) of the bearing (24) are extended on one side in such a fashion that they enter into a form-locking engagement with the clamping element (38) of the freewheel mechanism (35).

4. Actuating unit as claimed in claim 3,
c h a r a c t e r i z e d in that the inside ring (37) of the bearing (24) has a profiling (41) which permits a form-locking accommodation of the clamping element (38), and the outside ring (36) has at least one radial recess (39) and a subsequent slope or ramp (40) which, along with the profiling (41), limits at least one clamping slot in which the clamping element (38) is received.

5. Actuating unit as claimed in claim 4,
c h a r a c t e r i z e d in that the clamping element (38) is biassed in the direction of the recess (39) by means of a spring element (42).

6. Actuating unit as claimed in claim 5,
c h a r a c t e r i z e d in that the spring element (42) is configured as a circlip.

7. Actuating unit as claimed in claim 5,
c h a r a c t e r i z e d in that the spring element is configured as a leaf spring.

8. Actuating unit as claimed in any one of claims 1 to 7,
c h a r a c t e r i z e d in that the freewheel mechanism (35) is operable by means of an electromagnetic actuating unit (43).

9. Actuating unit as claimed in claim 8,
c h a r a c t e r i z e d in that the electromagnetic actuating unit (43) is comprised of an electromagnet (44) and a tappet (45) which is movable into a force-transmitting engagement with the clamping element (38).

10. Actuating unit as claimed in claim 9,
c h a r a c t e r i z e d in that the electromagnet (44) is designed as a bistable electromagnet.

11. Actuating unit as claimed in any one of the preceding claims,
c h a r a c t e r i z e d in that the clamping element (38) is designed as a jamming roller.

12. Actuating unit as claimed in any one of the preceding claims,
c h a r a c t e r i z e d in that the clamping element has the shape of a ball.

13. Actuating unit as claimed in any one of the preceding claims,
c h a r a c t e r i z e d in that the bearing (24) is designed as a ball bearing, a needle bearing, or a roller bearing.

14. Actuating unit as claimed in any one of the preceding claims,
c h a r a c t e r i z e d in that a second reducing gear (3) is provided between the electric motor (11) and the reducing gear (2).

15. Actuating unit as claimed in claim 14,
c h a r a c t e r i z e d in that the electric motor (11), the (first) reducing gear (2), and the second reducing gear (3) are designed as at least two independent subassemblies.

16. Actuating unit as claimed in claim 14,
c h a r a c t e r i z e d in that the electric motor (11), the (first) reducing gear (2) and the second reducing gear (3) are designed as each one independent subassembly.

17. Actuating unit as claimed in any one of the preceding claims,
c h a r a c t e r i z e d in that the (first) reducing gear (2) is configured as a ball-and-thread drive assembly (16-18).

18. Actuating unit as claimed in claim 17,
c h a r a c t e r i z e d in that the actuating element (7) is formed by the threaded nut (16) of the ball-and-thread drive assembly (16-18).

19. Actuating unit as claimed in any one of the preceding claims,
c h a r a c t e r i z e d in that the second reducing gear (3) is arranged on the side of the electric motor (10) remote from the brake linings (4, 5).

20. Actuating unit as claimed in any one of the preceding claims 14 to 19,
c h a r a c t e r i z e d in that the second reducing gear (3) is configured as a planetary gear.

21. Actuating unit as claimed in claim 20,
c h a r a c t e r i z e d in that the second reducing gear (3) is configured as a planetary gear with stepped planet wheels (31, 32).

22. Actuating unit as claimed in any one of claims 17 to 20,
c h a r a c t e r i z e d in that there is provision of a guide member (12) which embraces the threaded nut (16) of the ball-and-thread drive assembly (16-18), which is supported on a gearbox case (15) that accommodates the ball-and-thread drive assembly, and on which the threaded spindle (17), in turn, is axially supported.

23. Actuating unit as claimed in claim 22, c h a r a c t e r i z e d in that the axial support of the threaded spindle (17) is carried out by the intermediary of an axial bearing (26) by means of a radial collar (14).

24. Actuating unit as claimed in claim 22 or 23, c h a r a c t e r i z e d in that force-measuring elements are provided on the guide member.

25. Actuating unit as claimed in any one of the preceding claims 17 to 24, c h a r a c t e r i z e d in that an elastic seal (27) is interposed between the threaded nut (16) and the guide member (12).

26. Actuating unit as claimed in any one of claims 20 to 25, c h a r a c t e r i z e d in that the sun wheel (30) of the planetary gear is designed on the rotor (11), while the planet wheels (31, 32) are mounted in a planet cage (34) that is in a force-transmitting connection with the threaded spindle (17) and are comprised of each one first planet wheel (31a,32a) of large diameter that is in engagement with the sun wheel (30) and each one second planet wheel (31b, 32b) of small diameter that is in engagement with a ring gear (33).

27. Actuating unit as claimed in any one of claims 20 to 26, c h a r a c t e r i z e d in that the ring gear (33) of the planetary gear is formed of an internal toothing in a cover (23) which represents a case of the planetary gear and is mounted on the casing (8) of the electric motor (10).

28. Actuating unit as claimed in any one of claims 20 to 27, characterized in that the transmission of force between the planet cage (34) and the threaded spindle (17) is effected by means of a form-locking plug coupling.

29. Actuating unit as claimed in any one of claims 20 to 28, characterized in that the planet cage (34) is mounted in the cover (23) by means of a radial bearing (50).

30. Actuating unit as claimed in claim 28 or 29, characterized in that the form-locking plug coupling is connected to the planet cage (34) in a torsion-proof, radially yielding and flexible fashion.

31. Actuating unit as claimed in any one of the preceding claims 18 to 30, characterized in that the threaded spindle (17) is of a multi-part design.

32. Actuating unit as claimed in any one of the preceding claims 18 to 31, characterized in that the threaded nut (16) at its end remote from the first friction lining (4) includes a projection which is movable into abutment with a stop that is provided on the threaded spindle (17) and acts in a circumferential direction.

33. Actuating unit as claimed in any one of the preceding claims, characterized in that the electric motor (11) is configured as an electronically commutated electric motor energized by a permanent magnet.

34. Actuating unit as claimed in any one of the preceding claims 1 to 32,
c h a r a c t e r i z e d in that the electric motor is configured as a switched reluctance motor.

35. Actuating unit as claimed in any one of the preceding claims,
c h a r a c t e r i z e d in that there is provision of a position detection system (46) which permits detecting the position of the rotor (11).

36. Actuating unit as claimed in claim 35,
c h a r a c t e r i z e d in that the position detection system (46) includes a Hall sensor.

37. Actuating unit as claimed in claim 35,
c h a r a c t e r i z e d in that the position detection system (46) includes a magnetoresistive element.

add A1